RECIPROCITY

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PROBLEM OF SWIFT "ACTION AT A DISTANCE"

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Introduction

It is well known that currently accepted physical theory does not embrace any effect whose motion exceeds the speed of light in free space (tachyons notwithstanding). Neither accident nor design has thus far drawn much attention to any instance where this may be seen to be conspicuously untrue. A probable reason for this is the lack of serious effort made to discover such excessively rapid motion.

A search of the scientific literature of the present century discloses this omission. Nevertheless, the Reciprocal System Theory of Dewey Larson clearly indicates that phenomena exist whose effects are felt instantaneously throughout their range of action. These phenomena have, in the past, been described as the "action at a distance" forces: Electric, Magnetic, and, of course, Gravitational. Due to the difficulties inherent in the concept of "action at a distance", it has been popular to characterize the related phenomena as "field" effects; implying some sort of interaction between the field source and the surrounding space. The field explanation is appealing to many in that it seems to side-step the philosophically troubling "action at a distance", replacing it with something at least more tangible (though no less enigmatic). All that has really been accomplished, however, is to move the problem one step backward in the chain of explanation in that having defined the force interaction to be a function of the field now requires one to explain how the field comes into being.

Need For More Testing

The problem I wish to address can be formulated as is shown in Fig. 1. Suppose that two mutually complementary force field sources are located in such a proximity in space that there is a considerable force interaction. We may then

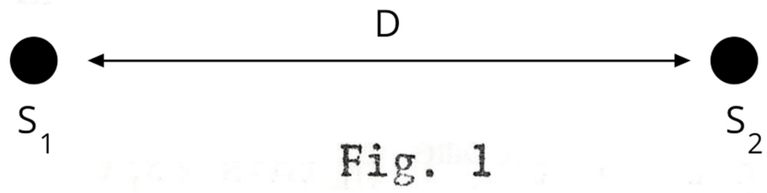

Fig. 1

ask the question: What will be the time lapse separating a perturbation of S_1 and its mechanical effect on S_2? It should be emphasized that I am not at all interested in the resulting electromagnetic radiation but only in the mechanical force interaction. Many would quickly respond to this question saying that with

a knowledge of the distance D and, of course, the speed of light, this could be immediately calculated. It is my contention, however, that such a calculation will not necessarily result in the correct answer as there has been no experimental verification that this effect propagates with the velocity of light, or, for that matter, with any velocity at all. What is needed is an experiment that can show, if not the exact speed of such an interaction, at least if it is or is not the velo-city of light. If it is not c, then in my opinion the next likely alternative is that the rate is greater than c and in the limit infinite speed (zero time).

Although we may theoretically use any of the three "action at a distance" effects for such an experiment, their separate characteristics are such that the electric field seems to be the most feasible for experimental implementation. Not only is the electric field easily generated, but it can also be distributed on bodies of low mass at very high potentials.

The experimental apparatus is shown schematically in Fig. 2. It consists in the main of two resonant piezoelectric crystals, unshielded, and separated by a variable distance r. A high voltage source imparts a large potential difference between the crystals thereby establishing an electrostatic field. Crystal X_1 is then excited by a signal source at its resonant frequency causing it to vibrate, which in turn cyclically perturbs the electric field. Crystal by virtue of its proximity to the field will then respond to these perturbations by undergoing resonant deformations which, due to the characteristics of these crystals, will be converted into electrical impulses. These impulses, as well as those that were used to drive X_1 are then observed on a phase comparator, which in practice can be a wide band oscilloscope. Once the phase relationship of the two signals has been established, receiver crystal X_2 is then moved a greater or lesser distance from X_1. As this is done, the phase relationship of the signals on the oscilloscope is carefully monitored.

The structure of this experiment is such that only two possible outcomes can be observed and each is significant: Either the signals undergo a phase shift or they do not. If the signals undergo a relative phase shift, then it is clear that the propagation velocity of these force effects is less than infinity. If this is true, then any theory that advocates that there is not a finite transit time associated with these effects has been shown to be necessarily incorrect. On the other hand, if there is no phase shift observed, then it has been shown that there is a phenomenon that ignores the limits of the velocity of light and as such is clear testimony of the fallacy of one of the most important results of the relativity theory.

If it is found that practical limitations preclude the feasibility of this particular experimental approach, it would be possible to achieve the same end using the magnetic field and the Hall Effect. Hall conductors made of InSb are sufficiently sensitive to measure accurately fields as small as $2X10^{-4}$ gauss. Instead of measuring the crystal phase shifts, we could compare the relationship between the driving current of a high frequency electromagnet and the equipotential shift in a nearby Hall conductor. The principles of the experiment remain otherwise unchanged. No matter what the outcome of this experiment should be, it is evident that the results will more than justify the costs and efforts involved.

Editor's Note: Readers of RECIPROCITY, you are invited to find whether Dr. Huck's proposed experiment can accomplish his professed objective: to help decide whether an upper limiting velocity must exist in the physical universe, as implied by the theory of relativity.

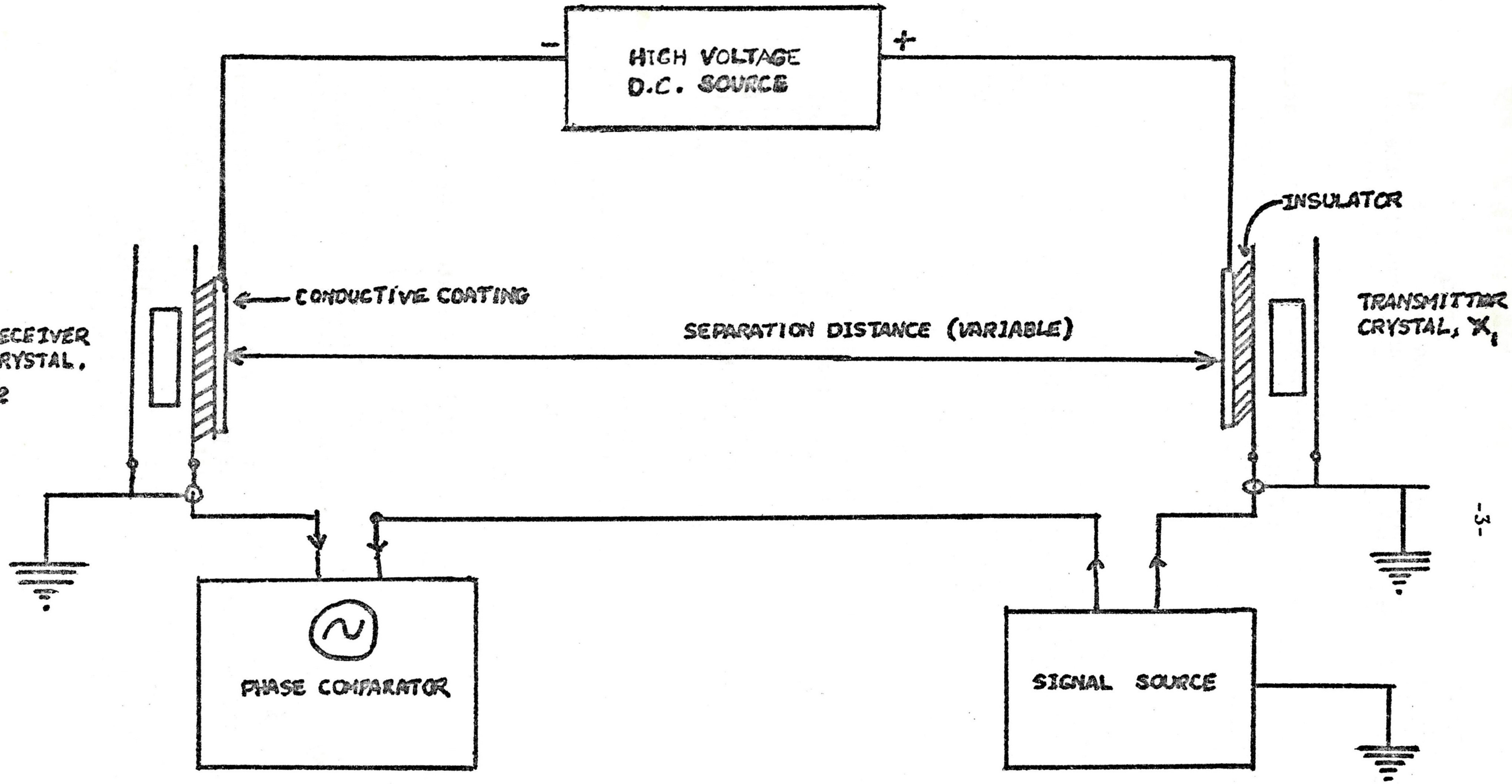

Fig. 2 Experimental Layout

The Reciprocal System of theory, formulated by Dewey B. Larson, implies that motion in coordinate time can and does occur at rates in excess of 3×10^5 kilometers/second. Thus, the Reciprocal theory challenges and repudiates the claim that the speed of light is an absolute limiting motion rate for the physical universe.

The question then is: Will Dr. Huck's proposed experiment show that "action at a distance" effects are independent, in fact, of the limiting motion rate imposed by the relativity theory of Einstein, thereby supporting with experimental evidence this point in Larson's Reciprocal System of theory?

Letter to the Editor:

Those of your readers who noted the theoretical basis of my article on Astronomical X-ray Sources which appeared in your March 1975 issue should be interested in the additional information concerning the emission from the Crab Nebula pulsar (NP 0532) that was obtained in recent observations that took advantage of occultation of the pulsar by the moon. As reported in the Jan. 10 issue of Science News, the observations show that all of the x-ray emission is coming from the nebula surrounding the pulsar, and none from the surface of the pulsar itself. These results came as a distinct surprise to the astronomers, and indicate the need for a revision of current ideas as to the physical nature of the pulsars.

On the other hand, the new information is in full agreement with the explanation of the emission that I gave in my article. According to my findings, the x-rays come from matter which has dropped back to speeds below unity (the speed of light) after having spent some time at higher speeds. As I pointed out in the article, in those cases where there is considerable diffuse low-speed material in the vicinity of the pulsar, as there is in the Crab Nebula, this material "will interact with the adjacent portions of the pulsar, and will reduce the speeds of some of its constituent particles below the unit level, causing the emission of x-rays". These low speed particles will, of course, lag behind the matter of the pulsar itself, and will form part of the nebula, or halo, around the pulsar, the region from which the new observations show that the x-rays are emitted.

D. B. Larson

NSA, INCORPORATED

NEW SCIENCE ADVOCATES (NSA) is now incorporated in the State of Utah as of January 20, 1976. Since then we have found ourselves quite busy setting up our non-profit corporation. We are slowly learning how to achieve a suitable set of By-Laws to govern our activities and build membership. We are applying to IRS for recognition of tax-exempt status for the purpose of obtaining mailing rates from the Postmaster for RECIPROCITY circulation such as are allowed for all other letters and literature of the same class.

We are a group of scientists and philosophers who recognize the great potential value of D. B. Larson's Reciprocal System of physical theory, and are interested in promoting study and understanding of that theoretical system. We do not all claim to have a full grasp of all aspects of the theory, nor do we necessarily accept every conclusion that Larson and his associates have reached. But we realize that here is something totally unprecedented: a GENERAL physical theory, one which derives ALL of its conclusions in ALL physical fields from a single set of basic premises.

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More details about organizing NSA will appear in next issue of RECIPROCITY.

Presented to Wisconsin Area Association of Physics Teachers Meeting, Viroqua, Wisconsin, April 9 and 10.

BENJAMIN FRANKLIN'S CONCEPT OF TIME

Frank H. Meyer

Introduction

I wish to report why I consider Benjamin Franklin's animate concept of time a better concept than the clock concept of time presently accepted by many modern physicists.

Franklin, one of the signers of the Declaration of Independence and one of America's first-rate physicists, conceived time to be one of the stuffs life is made of. Franklin recommended, therefore, that if you love life, then don't squander time.

In modern physics textbooks it is written that time physically is simply what you measure with a clock. This presupposes that you know what a clock is.

The modern physicist's operational definition of time is much like saying that speed is what you measure with a speedometer or that an electric current is what you measure with an ammeter.

Man-made clocks assume many diverse forms, but all are made more or less to measure and record some part or other of time. Furthermore, all living creatures, both plant and animal, are designed with built-in biological clocks, essential to the regulation and control of our rhythmic vital processess.

Nevertheless, for use in contemporary physical research, particularly biophysical investigation, I find the approved operational definition of time in terms of clocks at best quite questionable and at worst somewhat inadequate and even erroneous.

Shortcomings of the Clock Concept of Time

Any particular clock can measure only some small part of the finite time progression. Time itself is much more than what any clock can measure; in fact, it is infinitely more. However, I do not fault the operational definition of time on this score. I am well aware that it is not an essential purpose of a definition to be exhaustive.

I am also aware that not every term of physics or of any other science can be logically defined.

I regard TIME (together with SPACE and MOTION) as the fundamental terms of physics, chemistry and biology. The meaning of the fundamental terms of science must be postulated rather than defined. But while we must postulate the meaning of so basic a term of science like TIME, we do have a choice about how we do this. We can implicitly indicate without examination what time shall mean by arbitrarily adopting the operational definition of time or we can carefully examine the situation and discover how our basic terms are specifically interrelated objectively in the realms of the universe most closely accessible to us. Albert Einstein and modern physicists chose the first course. Isaac Newton and Benjamin Franklin chose the second course.

Three practical disadvantages of the clock concept of time may be identified and mentioned.

To begin with, a clock measures only one component of time, what D. B. Larson calls CLOCK TIME. A clock cannot and does not measure a second component of time, what Larson calls COORDINATE TIME.

Those who believe that a clock can measure all of time take it for granted that time has only ONE degree of freedom, that time is 1-dimensional. In fact, TIME has and must have as many dimensions as SPACE and I know no one who thinks that SPACE is 1-dimensional.

Secondly, a clock fails to disclose that isolated time does not singly exist any more than does a magnetic monopole. TIME only exists inseparably from MOTION and since SPACE also exists inseparably from MOTION, TIME exists, furthermore, only inseparably from SPACE.

Thirdly, a clock does not reveal the quantized character of time, space and motion. A clock in measuring duration, represents time as continuous when in fact physical units of time less than one quadrillionth of a second don't actually exist. Similarly, a meter stick in measuring distance represents space as continuous when actually units of space less than one millionth of a centimeter are non-existent. The basic unit of discrete motion is the rate of progression of one unit of space with respect to one unit of time, equivalent to 30 billion centimeters per second.

Advantages of Franklin's Concept of Time

In my opinion the merits of Franklin's concept of time, that it is one of the stuffs life's made of, has been quite underestimated and neglected.

Time IS a stuff life is made of. If time did not exist, no man-made clock would exist, since humankind in the form we know it would not have come to be either on earth or anywhere else in the physical universe. Whatever level of human existence may occur outside of time and space, the human body does not exist outside of time and space or else death would be unknown and human cadavers non-existent. Likewise, the bodies of animals and plants are made of space-time or motion and do not exist outside of time and space.

Time is an aspect of motion, as Aristotle recognized. The only other essential aspect of motion is space. Motion is an INVERSE relation between time and space. Consequently, without time and space neither light not darkness, which is merely empty space and time, can exist. Without space-time or motion electricity, magnetism, matter and such-like entities of the physical universe, would not exist.

The conspicuous advantages of Benjamin Franklin's animate concept of time is that it remedies the three main deficiencies of the clock concept of time.

1. The animate concept of time acknowledges the 3-dimensional character of time.
2. The animate concept of time explains the inseparability together with the distinctness of time and space.
3. The animate concept of time accounts for the quantized character of time and space as well as of energy and matter.

Benjamin Franklin's animate concept of time is preserved in the first fundamental postulate of Dewey Larson's Reciprocal System of physical theory:

The physical universe is composed entirely of one component, motion, existing in three dimensions, in discrete units and with two reciprocal aspects, space and time.

WHAT IS GRAVITATIONAL MOTION? Editor F. H. Meyer's paper, GRAVITATIONAL MOTION: AN INTERACTION?, has been published in Volume 41, page 40, 1975 of the Journal of the Minnesota Academy of Science.

NSA ANNUAL MEMBERSHIP MEETING. The first Annual Meeting of NEW SCIENCE ADVOCATES should be held at a time and place convenient to as many members and officers as possible. It is proposed that this Meeting be held in Minneapolis in August 12-14th. RECIPROCITY readers: let Secretary R. W. Satz know your response to this proposal, particularly if the time and place are convenient for you.

NSA MEMBERSHIP. The By-Laws establish two grades, Member Grade and Student Member. Membership shall be open to any individual who is interested in promoting the establishment of sound, consistent theories of the physical universe. Membership shall be accepted without discrimination on account of race, sex, color, creed, or national origin. It is proposed that for 1976 annual Member Grade dues be $8.00 and Student Member dues be $5.00. When approved by the Executive Board of NSA these will be the 1976 dues, payable to Treasurer Rainer Huck, 1195 So. Windsor Street, Salt Lake City, Utah 84105.

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